

Thinking Big: Using FIA remeasurement data to scope out a large-scale Forest Health project

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By using some of the basic FIA summary data on forest conditions from the AB1504 reports (per acre carbon statistics for different ownerships; figure 4.4 and table 4.4 in the AB 1504 report), it is possible to lay out an example of a potential project to significantly improve the health of California's forests. Converting the data into 'carbon efficiencies' focuses on existing forests and skips the issue of the benefits of more effective reforestation for the moment. ARB methodology basically only accounts for changes in carbon in the forest and accounts for few if any of the benefits we get from living in wood houses and using wood chips for part of our energy usage. However the 2014 IPCC protocols require advanced countries like the US and Canada to also consider products (in California, products become either building products or energy). I present two estimates using the 2014 IPCC methodology to bracket the actual estimate of benefits. These benefits should increase over time with better conversion efficiencies from forest to mill to consumer to post consumer/waste stream components. One conclusion from this approach is that getting National Forest timberlands to achieve the 'carbon efficiencies' of our family forests is feasible and could deliver significant overall climate benefits by improving forest health by reducing avoidable mortality losses. The differences in mortality loss percentages for wildfires, insects and disease, and natural/other between Private-family and National Forest are shown in bold in Table 1, and are very significant. The calculations below Table 1 provides some approximate numbers of the scale of potential annual climate benefits achieved by reducing avoidable mortality on National Forest timberlands. Based on experiences in other states that are using the Good Neighbor Authority to design and implement new forest management strategies, it could be very worthwhile to pursue a few pilot projects to test out different approaches for GHG funded 'forest health' projects.

Table 1. Carbon capture efficiency of different timberland owners after conifer needles pull in CO2

	Private - Corporate	Private - Family	National Forest	Reserve forests	All Ownerships
Million Acres	4.9	3.0	8.8	1.2	31.9
Gross tree growth - in tCO2/acre	3.37	2.19	2.78	1.78	2.42
Gross tree growth	100%	100%	100%	100%	100%
Removal - harvest	57%	11%	6%	1%	19%
Mortality - fire killed	1%	3%	23%	66%	17%
Mortality - cut and fire	2%	0%	1%	0%	1%
Mortality - insects and disease	3%	3%	12%	15%	8%
Mortality - natural/other	14%	21%	26%	31%	23%
Carbon Efficiency - ARB acctg (no products)	22%	61%	32%	Negative	33%
Carbon Efficiency - IPCC 2014 acctg (incl products)	80%	71%	38%	Negative	51%

The potential climate gains via a large-scale Good Neighbor Authority (GNA) project that would bring NFS timberland 'carbon efficiency' up to level of family forests in California can be estimated by applying the increased carbon efficiency to different areas of GNA pilot projects. If 10% of National Forest timberlands were brought up to family forest carbon efficiencies, the eventual IPCC (2014) based annual gains in metric tons of CO₂ (valued at \$15/ton), would be worth

$$0.82 \text{ mtCO}_2/\text{acre} * \$15/\text{ton} * 0.88 \text{ million acres} = \$12 \text{ million/year.}$$

Such a project would also generate green building material, bioenergy, and jobs. It may be an idea worth testing out if California wants to get some big bold successes in the forest sector. The state is pursuing one Good Neighbor Authority pilot in the American River, but pilots in other regions with different sets of forest management prescriptions would produce the real numbers needed to understand what is actually possible. We will not learn until we try.

Excerpt from the FIA report to the BOF to be presented on Dec 7, 2017:

Table 4.4. Average annual growth, mortality, harvest, and net change per acre in aboveground live tree carbon pool by ownership and land status of California's forests, 2001-2005 to 2011-2015. The "all ownerships" category includes all other state and federal agencies managing fewer overall acres of forest land in California. Table derived from Appendix 2, Table B10.

	Unreserved Forestland				Reserved Forest Land		All Forest Land
	Private - Corporate	Private - Noncorporate	National Forests		National Forests		All Ownerships
	<i>Metric tons CO₂e/acre/year</i>						
Gross tree growth	3.37	2.19	2.78		1.78		2.42
Removal - harvest	-1.93	-0.23	-0.16		-0.01		-0.45
Mortality – fire killed	-0.05	-0.07	-0.63		-1.17		-0.42
Mortality – cut and fire ¹	-0.08	-0.01	-0.04		0.00		-0.03
Mortality – insects and disease	-0.09	-0.07	-0.34		-0.26		-0.19
Mortality – natural/other	-0.46	-0.47	-0.72		-0.55		-0.55
Net change (95% CI)	0.75 (0.53)	1.33 (0.22)	0.89 (0.26)		-0.20 (0.47)		0.79 0.15)

1 - Mortality – Cut and fire: plots where tree mortality has occurred due to both harvest and fire.